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SOLID WASTES DEMONSTRATION GRANT ABSTRACTS

ENVIRONMENTAL CONTROL ADMINISTRATION
CINCINNATI, OHIO

1968

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U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

SOLID WASTES
DEMONSTRATION GRANT
ABSTRACTS

Grants Awarded January 1--June 30, 1968

Charles E. Sponagle
Sanitary Engineer Director

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

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The demonstration grants activity was established with the Solid Wastes Program to encourage and support demonstrations projects as directed by the Solid Waste Disposal Act of 1965. Principal functions include: advice concerning development of new applications; technical review of new applications; continuous monitoring of funded grant projects; dissemination of information resulting from funded projects; and development of required administrative and fiscal procedures. This publication was prepared to disseminate concise information concerning projects which received demonstration grant support between January 1 and June 30, 1968.

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PREFACE

The Solid Wastes Program

THE SOLID WASTE DISPOSAL ACT of 1965 (Title II of Public Law 89-272) directs the Secretary of the Department of Health, Education, and Welfare to initiate a national research and development program for new and improved methods of proper and economic solid waste disposal, and to provide technical and financial assistance to state and local governments and interstate agencies in the planning, development, and conduct of solid waste programs.

To carry out these directives, the Solid Wastes Program was established. Major responsibilities of the Program are: (1) To conduct and to support research-- on the nature and scope of the nation's solid waste problem; on methods for collecting and disposing of solid wastes more safely and efficiently; on techniques for recovering potentially valuable materials and energy from solid wastes. (2) To provide training and financial and technical assistance to local and state agencies that they may survey their needs for solid waste management and for developing and staffing programs capable of meeting both present and future needs. (3) To encourage and support projects that may demonstrate new and improved methods of solid waste collection, handling, and disposal.

The latter responsibility involves providing grant support for three project types:

1. A demonstration relating to the development and application of new and improved solid waste disposal methods, devices, or techniques.

2. A study and investigation of municipal or regional solid waste disposal practices, procedures, and programs, which may:

   a. provide solutions for regional or national solid waste disposal problems,

   b. lead to a demonstration of improved disposal practices.

3. A study and investigation of a particular solid waste or solid waste disposal problem, practice or technique, the findings of which will be of significant national value.

The Demonstration Grants Activity. This operation has been established within the Solid Wastes Program to implement the Program's responsibility for the encouragement and support of demonstrations projects as directed by the Act. Principal functions include: advice concerning development of new applications; technical review of new applications; continuous monitoring of funded grant projects (consisting principally of technical assistance to grantees, review and evaluation of the project's progress in attaining stated objectives, and ensuring that appropriate Federal requirements are met); dissemination of information resulting from funded projects; and development of required administrative and fiscal procedures.

This publication has been prepared to disseminate concise up-to-date information concerning projects which received demonstration grant support between January 1, 1968, and June 30, 1968. We hope that this information will be useful to workers in the solid waste field, will lead to productive interchanges between those having similar solid wastes problems, and will permit the widespread application of the new and improved solid waste techniques now being demonstrated by many of these projects.

-- RICHARD D. VAUGHAN

Chief, Solid Wastes Program

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These abstracts describe projects that received demonstration grant support from the Solid Wastes Program during the six-month period January--June, 1968. Earlier projects, which received grant support prior to January 1, 1968, are described in Public Health Service Publication No. 1821, Summaries of Solid Wastes Demonstration Grant Projects--1968.

Organization of Abstracts

Each project is identified by title, type, and grant number. The grantee, project director, cost and duration of the project is shown. A brief statement of the project's objectives and procedures completes the abstract.

Clarifying remarks concerning certain items of the abstracts appear below:

Project Type	Each project is identified as a "Demonstration" or a "Study & Investigation" in accordance with categories described in the preface.
Grant Number	The Solid Wastes Program's identifying number for the project. This should be used in all contacts with the Program concerning the project.
Grantee	The recipient of the grant support. Grantees may be state, interstate, or local agencies of government, or public or private nonprofit organizations.
Project Director	The person designated by the grantee as having primary responsibility for conduct of the project.
Estimated Total Project Cost	The estimated total cost of the project over the entire project life.
Grantee's Share	That portion of the estimated total project cost which will be borne by the grantee.
Federal Share	That portion of the total estimated project cost which may be made available to the grantee as Federal grant support. Grant funds are committed to a project on an annual basis. For example, a project which will take

three years to complete may receive the total Federal share in three annual increments, as indicated by the "01", "02", and "03" designations appended to the "Federal Share" amounts.

Date Project Started — The authorized beginning date of the project.

Date Project Ends — The date by which the project will be completed. When circumstances warrant, a time extension beyond the original completion date may be authorized by the Solid Wastes Program.

Acknowledgements

Information used to prepare this publication was furnished by the grantees and/or project directors listed herein.

Solid Wastes Program personnel who contributed to the preparation of this publication were: Richard P. Lonergan, Chief, Demonstration Grants Activities, provided overall advice and guidance; original drafts of the abstracts were prepared by Demonstration Grants Project Officers, R. Kent Anderson, Stanley J. Endlich, Eugene M. Herson, Thomas C. Jones, Steven J. Levy, Charles E. Orr, Robert P. Stein, and Richard J. Wigh; manuscript was prepared by Kay Blankenship, Isabel C. Carr, Sandra Loos, and Susan Studt.

CONTRACT BOND FINANCING OF MULTI-MUNICIPAL INCINERATOR SYSTEMS

Project Type: Demonstration Grant No. D01-UI-00077

Grantee: Board of Wayne County Road Commissioners

Project Director: George R. Bingham
Sanitary Engineer
Wayne County Road Commission
726 City-County Building
Detroit, Michigan 48226

Estimated Total Project Cost: $24,000

GRANTEE'S SHARE: $15,700

FEDERAL SHARE: $ 8,300 - 01
(by year of project life)

Date Project Started: March 1, 1968 Date Project Ends: Feb. 28, 1969

OBJECTIVES: To develop an organizational structure for the construction and operation of a countywide system of incinerators, and to present the plan and project to appropriate officials of the county's municipalities and representatives of adjoining counties.

PROCEDURES: The first phase of the project will involve preparation of the presentation and development of additional legal and financial data. The financing and service agreements will be drafted by the county's legal consultants, Miller, Canfield, Paddock and Stone, and will include materials prepared by the firms of Kenowet, MacArthur & Co. (financial consultant) and Consoer, Townsend & Associates (engineering consultant). The three consultants will also prepare related and supporting engineering, legal and financial information and data. A proposed organization will be developed for a policy making and rate review body on which the municipalities would be represented. Visual aids will be prepared to assist in presenting the plan and project. All pertinent material will be consolidated into a report.

In June the Board advised the Solid Wastes Program that additional studies were being undertaken to revise the proposed solid waste management system, and requested that this grant be cancelled. The requested cancellation was effected on June 24, 1968. The Board further indicated its intention to apply for a new grant for the revised project.

STUDY OF INTEGRATED DISPOSAL OF SOLID AND LIQUID WASTES

Project Type: Study & Investigation Grant No. D01-UI-00108

Grantee: City of Portland, Maine

Project Director: George C. Capelle, Jr., Chief Engineer
Department of Public Works
404 City Hall
Portland, Maine 04111

Estimated Total Project Cost: $76,500

GRANTEE'S SHARE $25,500

FEDERAL SHARE $51,000 - 01
(by year of project life)

Date Project Started: Feb. 1, 1968 Date Project Ends: Jan. 31, 1969

OBJECTIVES: To develop a plan for the satisfactory disposal of solid wastes from the City of Portland, which will: (a) provide maximum benefit from the utilization of by-products and salvage; (b) integrate the disposal of solid and liquid wastes to the greatest practical extent; (c) provide facilities for the disposal of solid wastes from neighboring communities, should this be mutually advantageous.

PROCEDURES: The project will be conducted by City of Portland personnel and the consulting engineering firm of Metcalf & Eddy, Boston, Massachusetts. Major elements of the study are described below.

1. Population data will be developed for Portland and the Greater Portland region. Data will be developed for all solid wastes generated in the study area including abandoned vehicles, appliances, oversized burnable wastes, special industrial and commercial wastes, and municipal rubbish and garbage. A design quantity figure will be established for each category of solid wastes.

2. The required refuse disposal facility capacity to serve (a) individual municipalities; and (b) the entire region, will be determined. Preliminary plans and comparative cost estimates will be prepared for each alternative.

3. The market potential for heat and/or power produced by an incineration process will be studied. Considerations will include (a) power generation for internal plant usage or for sale to private customers; (b) seawater desalination to produce salts useful for snow

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and ice control; (c) production of steam and hot water for internal plant usage or sale to municipal or private customers; and (d) reduction in quantities of exhaust gases to obtain lower total operating costs for air pollution control and mechanical draft equipment.

4. The following alternate methods of handling garbage will be evaluated: (a) separate collection, central grinding with discharge to the sewer system, removal at the sewage treatment plant with normal sewage solids by conventional methods, dewatering, and incineration of the garbage-sewage sludge mixture; (b) separate or combined collection and incineration with rubbish and trash.

5. Alternate methods of disposal of bulky wastes, both combustible and noncombustible, will be evaluated. Incineration after size reduction, along with rubbish and garbage, or batch incineration in a special furnace, without size reduction, will be considered.

6. The economics and feasibility of conventional continuous-feed incineration versus a high temperature (3,000°F) incineration process will be studied.

7. The market potential and economic value for salvaged metal, and for screened and graded incinerator residue as a road material or fill, will be evaluated.

8. The consultant will provide complete preliminary construction and operating cost estimates for the recommended waste disposal facilities, and recommend an administrative plan for the municipalities' sharing of the construction and operating costs.

MAXIMUM UTILIZATION OF SANITARY LANDFILLS
THROUGH INTEGRATED REGIONAL PLANNING

Project Type: Study & Investigation Grant No. D01-UI-00113

Grantee: County of Orange
Administration Building
515 N. Sycamore Street
Santa Ana, California 92701

Project Director: A. S. Koch
Road Commissioner and County Surveyor
400 W. 8th Street
Santa Ana, California 92701

Estimated Total Project Cost:	$120,054
GRANTEE'S SHARE:	$ 40,018
FEDERAL SHARE:	$ 40,018 - 01
(by year of project life)	$ 40,018 - 02

Date Project Started: Feb. 1, 1968 Date Project Ends: Jan. 31, 1970

OBJECTIVES: 1. To develop a unique, long-term regional solid waste disposal program involving novel concepts for the reuse of sanitary landfill sites to obtain the maximum efficiency of use and reuse of publicly owned lands while minimizing overall costs of sanitary landfill operations.

2. To develop a prototype interagency planning program to integrate all governmental planning functions (highways, schools, flood control, water quality control, air pollution control, parks, recreation, refuse disposal, etc.). This type of planning program will provide useful procedures and policies that will aid in securing the public's acceptance of regional solid waste management programs.

3. To develop a "model" ordinance which will provide the means for implementing the regional solid waste disposal program developed from the interagency planning program noted in (1) and (2) above.

PROCEDURES: The study will be conducted by the Orange County Road Department, which is responsible for the administration and operation of the County's refuse disposal program. Consulting engineering services will be furnished by Engineering-Science, Inc., Arcadia, California. The study area will be Orange County. Consideration will be given to including areas outside the county, should they be determined to logically affect the study.

A technical advisory committee of representatives from various county agencies, will be established to guide and review the work, assure coordination between agencies, and assist in a public relations program. Basic data relative to both current and estimated future generation of solid wastes in the study area will be developed. Municipal, commercial, agricultural and industrial wastes, as well as any special wastes, will be considered. Information concerning existing solid waste collection and disposal systems in the study area will be developed. Policies and concepts of the State's solid waste program, and those of adjacent counties, will be investigated for possible effects on implementation of the Orange County plan. Existing and potential future land use and zoning will be determined. Technical criteria for sanitary landfill construction will be established.

An interagency planning committee, comprised of private citizens and representatives of the county agencies, will be formed to formulate and implement definitive planning measures. This committee will develop land utilization concepts for completed sanitary landfills, which can be integrated with the programs of the various county agencies.

Following evaluation of these concepts, potential sanitary landfill sites will be selected, to provide adequate solid waste disposal capacity for the county until the year 2010. Plans will be developed for a system of transfer stations. A solid waste management program for the entire county will then be finalized. The benefits of planning for solid waste disposal in this manner (i.e., on an integrated regional basis) will be evaluated in comparison with other alternative planning methods. A model ordinance will be developed requiring that sanitary landfills be considered on a regional planning basis, and enabling the establishment of a regional agency to plan and implement such a program. Landfill reuse concepts and provisions of the model ordinance will be generalized to emphasize fundamental planning considerations and criteria developed, so as to make the results of this study of maximum use in other areas.

DEMONSTRATION OF DISPOSAL OF WASTE WOOD AND
BULKY BURNABLE OBJECTS BY A LARGE CITY

Project Type: Demonstration

Grant No. D01-UI-00115

Grantee: City of St. Louis
City Hall
St. Louis, Missouri 63103

Project Director: G. Wayne Sutterfield
Commissioner of Refuse
Collection and Disposal
4100 South First Street
St. Louis, Missouri 63118

Estimated Total Project Cost:	$397,500
GRANTEE'S SHARE:	$132,500
FEDERAL SHARE:	$207,000 - 01
(by year of project life)	$ 29,000 - 02
	$ 29,000 - 03

Date Project Started: April 1, 1968 Date Project Ends: March 31, 1971

OBJECTIVES: To demonstrate: (1) the feasibility of preparing waste wood for sale as pulpwood; (2) the feasibility of effecting size reduction of bulky burnable objects for incineration, at a site not adjacent to the incinerator. To develop detailed information concerning the quantities of waste wood and bulky burnable objects generated in a major city.

PROCEDURES: The St. Louis Department of Streets will carry out the project, with the cooperation of the Department of Parks and Recreation (whose personnel will supervise field operations concerned with forestry), and the Department of Welfare (whose personnel will supervise operations at the City Workhouse which will be the site of the demonstration). An engineering consultant will be selected to design the required facilities, and to provide other consulting engineering services.

All waste delivered to the site will be weighed, and appropriate records maintained of the weight, source, type of material, and other significant items. Waste wood will be sorted into the following categories:

1. Wood that can be sold with no further processing.

2. Wood which requires cutting or splitting to become suitable for sale.

3. Wood which is not suitable for sale and which would be chipped and used as mulch, or incinerated.

Saleable waste wood will be processed and picked up by a local pulpwood dealer. Bulky burnable objects will be reduced in size by a shredder and transported to a municipal incinerator approximately two miles away. Records will be kept of all materials leaving the processing area.

DISPOSAL OF WOOD AND BARK WASTES BY INCINERATION OR ALTERNATIVE METHODS

Project Type: Study & Investigation Grant No. D01-UI-00119

Grantee: Forest Research Laboratory, Oregon State University

Project Director: Stanley E. Corder
Mechanical Engineer
Forest Reserach Laboratory
Oregon State University
P.O. Box 571
Corvallis, Oregon 97330

Estimated Total Project Cost: $75,000

GRANTEE'S SHARE: $25,000

FEDERAL SHARE: $50,000 - 01
(by year of project life)

Date Project Started: Feb. 1, 1968 Date Project Ends: Jan. 31, 1969

OBJECTIVE: To evaluate various utilization and disposal methods for wood and bark wastes.

PROCEDURES: A survey will be made of both domestic and foreign literature related to wigwam burners, incineration, combustion of wood and bark fuels, and utilization aspects of wood and bark residues. Information concerning current disposal practices and problems will be obtained by field visits to existing facilities and by consultation with state solid waste program personnel, equipment manufacturers, and others working in this field. Based on information obtained, several methods of wood and bark waste utilization and disposal will be selected for intensive study. Engineering and economic analyses of the most promising methods will be made by appropriate consultants, and recommendations for the demonstration of such methods will be developed.

TO DETERMINE THE FEASIBILITY OF SHREDDING, MIXING, AND COMPACTING A FULL RANGE OF MUNICIPAL SOLID WASTES FOR RECLAIMING SUBMERGED LANDS

Project Type: Study & Investigation

Grant No. D01-UI-00121

Grantee: City of Cleveland
Department of Public Service
City Hall - Room 227
Cleveland, Ohio 44114

Project Director: Erhardt Kunde
Chief of Laboratories
Department of Health & Welfare
Room 16 - City Hall
Cleveland, Ohio 44114

Estimated Total Project Cost: $150,000

GRANTEE'S SHARE: $ 50,000

FEDERAL SHARE: $100,000 - 01
(by year of project life)

Date Project Started: June 1, 1968

Date Project Ends: May 31, 1969

OBJECTIVES: To investigate the feasibility of combining shredded municipal solid wastes with fly ash, dewatered sewage sludge, river and lake dredgings, and incinerator burnout, so as to produce a dense, compacted sanitary mass suitable for use as fill in the reclamation of submerged lands.

PROCEDURES: All technical aspects of the study will be carried out by Crobaugh Laboratories, Cleveland, Ohio. Bacteriological determinations will be made by the Cleveland Department of Health. Enteroviral determinations will be performed by the Virology Laboratory of Metropolitan General Hospital.

A test facility will be constructed at Crobaugh Laboratories at which the project will be conducted. This facility will be larger than laboratory scale, but smaller than pilot plant size. Previous laboratory work has provided basic information concerning the optimum mix of waste and binder materials, but, further work will be done. The waste materials and binder will be compressed into compacts for the study. Generally, these will be in the form of 9" x 4" x 3" "bricks," however, it will be attempted to make at least 2 or 3 large compacts, approximately 2 to 3 feet long by 1 to 1½ feet deep and wide. Changes in composition of the compacts will be documented, as well as strength and integrity of compacts made from differing mixes.

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Pollution effects of the compacts on the environment in which it is proposed to place them (Lake Erie) will be investigated. A small laboratory tank will be loaded with prepared compacts and lake water circulated through it. From time to time samples of the circulating water will be withdrawn for chemical, bacteriological, and viral analyses. The tank will be covered so that air samples can also be collected, and analyzed for CO_2, CO, O_2, N_2 and hydrocarbons. Anticipated pollutional effects of reclaiming submerged lands by use of compacts as a fill material will be projected.

Project findings will be used to develop criteria for appropriate modifications of Cleveland's present solid waste disposal system.

INTEGRATED STUDY OF REFUSE DISPOSAL -
MADISON, ST. CLAIR AND MONROE COUNTIES, ILLINOIS

Project Type: Study & Investigation Grant No. D01-UI-00122

Grantee: Southwestern Illinois Metropolitan Area Planning Commission

Project Director: Theadore H. Mikesell, Executive Director
Southwestern Illinois Metropolitan Area
Planning Commission
121a West Main Street
Collinsville, Illinois 62234

Estimated Total Project Cost: $68,540

GRANTEE'S SHARE: $22,850

FEDERAL SHARE: $45,690 - 01
(by year of project life)

Date Project Started: April 1, 1968 Date Project Ends: March 31, 1969

OBJECTIVES: To formulate a program which can be undertaken jointly, or separately, by the counties to provide adequate means of solid refuse disposal for the entire three-county area.

PROCEDURES: The consulting engineering firm of Horner & Shifrin, St. Louis, Missouri, will conduct the major portion of the study.

Population and land use in the study area will be investigated. Current and expected future amounts of solid wastes generated in the area will be estimated on the basis of population projections, data from significant industries, and truck weighings in significant areas. Information on existing collection and disposal systems will be obtained. Existing and potential disposal sites will be evaluated as to suitability for use for sanitary landfill, incineration, salvage or composting operations, or a combination of disposal methods. In addition, the sites will be evaluated as to their proximities to centers of solid waste production, and to points of disposal of salvable materials. Consideration will be given to use of transfer stations, and to both truck and rail transportation. Overall costs of refuse disposal for those methods most applicable to the study area will be estimated.

Industrial interest in salvable materials will be explored and an attempt made to determine specifications for acceptable materials, and the extent of the probable market.

A recommended long-range disposal plan will be developed. Two basic plans will be considered:

Alternate A. Development of a plan considering the three-county area as a whole, divided on the basis of reasonable service areas, and not necessarily according to existing divisions of government.

Alternate B. Development of a plan for each county so that any individual county can establish and carry out the program within its area of jurisdiction.

Various applicable means of financing the recommended disposal plan will be examined. Relevant statutes and ordinances will be reviewed to determine their applicability. If found desirable or necessary, new statutory provisions will be developed.

SANITARY LANDFILL AND RECLAMATION PROJECT

Project Type: Demonstration — Grant No. D01-UI-00133

Grantee: City of Big Spring, Texas

Project Director: Ernest E. Lillard
Director of Public Works
P.O. Box 391
Big Spring, Texas 79720

Estimated Total Project Cost:	$144,639
GRANTEE'S SHARE:	$ 48,213
FEDERAL SHARE:	$ 35,481 - 01
(by year of project life)	$ 29,971 - 02
	$ 30,974 - 03

Date Project Started: Jan. 1, 1968 — Date Project Ends: Dec. 31, 1970

OBJECTIVES: To demonstrate that by means of a properly operated sanitary landfill eroded land can be reclaimed for agricultural purposes, further erosion damage to an interstate highway and productive land can be prevented, and an effective soil erosion control program can be successfully implemented.

PROCEDURES: The project will be conducted by City personnel, with the advice and assistance of the U.S. Soil Conservation Service. A badly eroded area near the City has been chosen as the demonstration site. Drainage ways will be rerouted into specially prepared courses designed by the Soil Conservation Service, thus relieving the existing gulleys from the drainage function. This work will be completed before landfill operations begin in the area to be reclaimed. Landfill operations will continue until the area has been adequately filled, at which time it will be sodded and seeded in accordance with the plan prepared by the Soil Conservation Service to prevent recurrence of erosion damage. Records will be kept of the weights and volumes of all solid wastes deposited in the landfill. Routine surveys will be made to determine the volume of compacted refuse and cover material. Detailed cost records will be kept. The original and final condition of the area will be documented.

SYSTEMS ANALYSIS STUDY OF THE CONTAINER-TRAIN METHOD OF SOLID WASTE COLLECTION AND DISPOSAL

Project Type: Study & Investigation Grant No. D01-UI-00135

Grantee: City of Wichita Falls, Texas

Project Director: John J. Roark, P.E.
Director of Public Works
City of Wichita Falls
P.O. Box 1431
Wichita Falls, Texas 76307

Estimated Total Project Cost:	$270,005
GRANTEE'S SHARE	$ 90,002
FEDERAL SHARE:	$ 68,530 - 01
(by year of project life)	$ 69,070 - 02
	$ 42,403 - 03

Date Project Started: Feb. 1, 1968 Date Project Ends: Jan. 31, 1971

OBJECTIVES: To develop a comprehensive management model of a solid waste collection and disposal system utilizing the container-train system of collection.

PROCEDURES: Design of the studies, overall project management, and systems analysis and model development studies will be carried out by the consulting firm of Pinnell and Associates, College Station, Texas.

Data correlating generation rates of commercial, industrial, and municipal wastes with land use will be developed. The annual fluctuation of solid waste generation will be determined. A detailed comparison of the existing packer collection system and the container-train system will be made. This will include documentation and evaluation of the economic, time, and motion requirements, safety, reliability and productivity, aesthetics and public appeal, health aspects, and overall effectiveness of both systems. Optimization studies will be conducted to furnish information on how the collection operation should be performed to maximize the efficiency of the container-train system and minimize operational costs.

These studies will consider routing of the trains, scheduling of the "mother" trucks, and various other operational aspects of the collection procedure. The Wichita Falls Urban Transport Study will provide a basic transportation network system for this purpose. Results of the above studies will serve as the basis for development of a comprehensive management model to simulate the total operation of collection and disposal by a container-train system.

DAIRY MANURE COLLECTING AND COMPOSTING STUDY

Project Type: Study & Investigation — Grant No. D01-UI-00137

Grantee: City of Cerritos
19400 So. Pioneer Blvd.
Cerritos, California 90701

Project Director: Charles L. Senn
Lecturer, University of California at Los Angeles
Building 5 - F
Los Angeles, California 90024

Estimated Total Project Cost: $135,000

GRANTEE'S SHARE: $ 45,000

FEDERAL SHARE: $ 90,000 - 01
(by year of project life)

Date Project Started: March 1, 1968 — Date Project Ends: Feb. 28, 1969

OBJECTIVES: To develop a methodology to solve the severe nuisance and health hazard problems arising from raising and feeding large numbers of dairy cattle on feed lots and corrals located in proximity to residential developments.

PROCEDURES: The project will be conducted by a consortium of local governmental agencies, university and private consultants, and a dairyman's cooperative.

Possible methods of dairy manure disposal will be reviewed and evaluated. Objectives will be developed for control of the most significant problems associated with cattle manure, including flies, odors, dust, drainage, and possible disease hazards. Related laws, ordinances, and policies will be identified. Existing conditions on a wide variety of dairy corrals and feed lots will be studied under both dry-weather and wet-weather conditions. Existing and proposed methods of collecting manure from corral surfaces will be evaluated.

Feasibility of manure composting by individual dairies will be investigated. Probable markets, and economics of the process will be evaluated. Current composting technology, equipment, practices and costs will be surveyed. Bench-scale composting tests will be conducted, and data obtained will be evaluated to determine basic operational parameters. A full-scale project will be designed to demonstrate optional disposal procedures developed.

SOLID WASTE DISPOSAL BY CONTAINERIZATION

Project Type: Study & Investigation Grant No. D01-UI-00138

Grantee: Humboldt County, Department of Public Works

Project Director: Richard S. Titera, Assistant Director
Humboldt County Department of Public Works
1106 Second Street
Eureka, California 95501

Estimated Total Project Cost:	$37,000
GRANTEE'S SHARE:	$12,333
FEDERAL SHARE: (by year of project life)	$24,667 - 01

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: To investigate the feasibility of establishing a countywide refuse disposal system for small isolated communities and rural areas, using portable containers for waste storage and transfer to centralized sanitary landfills.

PROCEDURES: The study will be made by the County Department of Public Works, with participation by the California State Department of Public Health, the County Health Department, and the County Planning Department. Assistance is also anticipated from a consultant expert in containerization.

Existing collection and disposal services will be evaluated. Sources, types, and quantities of solid wastes generated in the study area will be determined, seasonal variations reviewed, and future waste volumes estimated. The area to be served by each container facility, waste volumes to be handled, and environmental controls needed, will be determined.

A preliminary design of the system will be made, involving study of available transportation vehicles and containers, alternate locations of sanitary landfills, alternate locations of portable disposal facilities, and transportation patterns and costs for various combinations of alternates. The various alternates will be evaluated on the basis of cost and performance comparisons and the best system selected and designed in detail. An administrative structure to ensure efficient operation of the system will be identified. Financing methods and needed legislation will be studied.

TREATMENT AND REUTILIZATION OF SOLID WASTES FROM WATER TREATMENT PROCESS

Project Type: Study & Investigation Grant No. DO1-UI-00142

Grantee: Village of Park Forest
Park Forest Village Hall
200 Forest Boulevard
Park Forest, Illinois 60466

Project Director: Dr. E. Vey
Assistant Director
Mechanics Research Division
I.I.T. Research Institute
10 West 35th Street
Chicago, Illinois 60616

Estimated Total Project Cost: $66,942

GRANTEE'S SHARE: $22,314

FEDERAL SHARE: $44,628 - (
(by year of project life)

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: 1. To investigate the feasibility of methods of dewatering limestone sludge on a scale that can be economically applied to the total sludge output from the treatment of the well water supply of the Village of Park Forest, Illinois, and other villages with similar problems.

2. To determine economically feasible uses for the dewatered sludge.

PROCEDURES: The project will be conducted by the Illinois Institute of Technology Research Institute, Chicago, Illinois.

Sludge samples from the treatment process will be analyzed to determine standard engineering properties such as shrinkage limit, water content, and consolidation characteristics (coefficients of consolidation and compressibility). These measurements will provide a basis for comparison in evaluating the results of the experimental program. Experiments will then be performed to investigate means of accelerating the consolidation process.

Consolidation using Electro-osmosis. A direct current potential will be applied across consolidation samples of various thicknesses and cross-sectional areas. Loading will be applied in increments determined on the basis of standard one-dimensional consolidation tests,

with consideration to the maximum loads feasible in a full-scale application. The effects of different potentials on the consolidation rate will be determined and the desirability of changing the electrolyte concentration in the sludge will be evaluated.

Three Dimensional Consolidation. Experiments will be performed on cylindrical and rectangular portions of various sized samples wherein filters are provided on all surfaces. This will involve the design of filters to determine the most efficient filter from the standpoint of economical usage on a large scale and efficiency of drainage during consolidation. The effects of the different filters and geometries on consolidation rates will be determined.

Combinations of Above Methods. Experiments will be performed on samples wherein electro-osmosis is used and three dimensional drainage is permitted. Relative merits of each technique will be determined from the standpoint of power consumption and economical utilization on a large scale.

The feasibility of applying these techniques in full-scale use will be investigated. Consideration will be given to anticipated design problems.

Methods of utilizing the dewatered sludge will be investigated. Utilization as an additive to improve the properties of soils used in base course under pavements and in embankments appears promising. Experiments will be performed to determine optimum sludge concentrations in such soils.

DEMONSTRATION OF MODERN CURRICULA AND TECHNIQUES IN THE FIELD OF SOLID WASTE MANAGEMENT

Project Type: Demonstration

Grant No. D01-UI-00145

Grantee: Charles County Community College
LaPlata, Maryland 20646

Project Director: Mrs. Belva Jensen
Associate Professor, Biology

Estimated Total Project Cost:	$136,950
GRANTEE'S SHARE:	$ 45,651
FEDERAL SHARE:	$ 30,433 - 01
(by year of project life)	$ 30,433 - 02
	$ 30,433 - 03

Date Project Started: June 1, 1968

Date Project Ends: August 31, 1971

OBJECTIVES: To demonstrate a method for training technicians in solid waste management.

PROCEDURES: A one-year Technician-grade Curriculum in Solid Wastes Management will be developed to train personnel in the operation of all phases of solid waste collection and disposal methods that might be used by a municipality or region. Courses directly related to solid waste management will cover such topics as collection, incineration, composting, landfill management, vector control, site selection, soil types and characteristics, and community economics.

A five-day short course will be established for current solid waste disposal operating personnel to provide demonstrations of proper use of equipment and techniques. Health and safety aspects of the work will be stressed.

Symposia will be established for solid waste management personnel in the greater Washington area to keep them informed of developments on a regional basis in the solid wastes field.

EVALUATION OF AIR POLLUTION CONTROL EQUIPMENT FOR
SMALL BATCH-FEED MUNICIPAL INCINERATOR

Project Type: Study & Investigation Grant No. D01-UI-00156

Grantee: Incorporated Village of Freeport, New York
46 N. Ocean Ave.
Freeport, New York 11520

Project Director: Walter J. Pope, P.E.
Partner, Baldwin and Cornelius Co.
101 S. Bergen Place
Freeport, New York 11520

Estimated Total Project Cost: $101,000

GRANTEE'S SHARE: $ 33,667

FEDERAL SHARE: $ 67,333 - 01
(by year of project life)

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: To test and evaluate various pilot models of air pollution control equipment so as to determine the specific type that will allow the Village of Freeport to meet the local emissions regulations on its 150-ton/per day batch-feed incinerator.

PROCEDURES: The study will be conducted by the consulting engineering firms of Baldwin and Cornelius Co., Freeport, with the assistance of Mr. E. M. Voelker of the firm of Nash, Cadmus and Voelker as Incinerator Consultant. An appropriate testing organization will be retained to conduct the equipment tests to be made.

Pilot models of wet scrubbers will be tested at various resistance levels. Pilot models of two electrostatic precipitators will also be tested. One of the wet scrubbers will be used as a control to insure identical tests. Data to be collected will include characteristics and weight of refuse burned; water usage; weight of particulate matter entering and leaving the pilot unit; gas stream velocities and temperatures, and CO, CO_2, and O_2 content of the gas stream entering and leaving the pilot unit. Samples of sludge in the scrubbers will also be collected and analyzed for chemical content and pH. This data will permit evaluation of particulate removal efficiencies at various resistances for several scrubbers, percentage of various particle sizes removed, and relation of the weight of particulate matter emitted to the weight of refuse burned. Water requirements, power requirements, and operational costs will also be determined.

REGIONAL SOLID WASTE STUDY - DESIGN AND IMPLEMENTATION PROGRAM

Project Type: Study & Investigation Grant No. D01-UI-00159

Grantee: Central Savannah River Area Planning and Development Commission
630 Ellis Street, 2nd Floor
Augusta, Georgia 30902

Project Director: Ronald Bonitatibus
Engineering Consultant
Central Savannah River Area Planning and Development Commission

Estimated Total Project Cost:	$180,000
GRANTEE'S SHARE:	$ 60,000
FEDERAL SHARE:	$ 40,000 - 01
(by year of project life)	$ 40,000 - 02
	$ 40,000 - 03

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1971

OBJECTIVES: To demonstrate the effectiveness of an area commission in dealing with problems of solid waste collection and disposal by developing and implementing a regional plan for solid waste disposal in the 13-county area served by the Commission.

PROCEDURES: The project will be conducted by the Commission's staff, with consultative and advisory services provided as required by the consulting engineering firm of Black & Veatch, Kansas City, Missouri.

During the first year of the project the Commission's staff, with the cooperation of State and local health officials, will survey the 13-county area to determine the magnitude of the solid wastes problem. Possible methods of solid waste disposal on a regional basis will be studied. Existing ordinances, rules, and regulations relating to solid wastes will be reviewed and needed improvements recommended. A regional solid waste disposal program will be developed for implementation during the last two years of the project.

The Commission's staff will work closely with local officials to coordinate their efforts in implementing this plan and will also be available on a consultative basis to provide required assistance in the various phases of solid waste collection, storage, or disposal.

An appropriate public relations and education program will be conducted. A training program will be developed for landfill operators and interested municipal officials.

SOLID WASTES DISPOSAL PROGRAM MULTI-GOVERNMENTAL-METROPOLITAN AREA

Project Type: Study & Investigation Grant No. D01-UI-00161

Grantee: Fox Valley Council of Governments
12 Floor, Zuelke Building
Appleton, Wisconsin 54911

Project Director: Eugene E. Franchett
Executive Director
Fox Valley Council of Governments

Estimated Total Project Cost: $38,890

GRANTEE'S SHARE: $12,963

FEDERAL SHARE: $25,927 - 01
(by year of project life)

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: To develop an administratively acceptable and economically feasible solid waste disposal plan and program capable of serving the present and future needs of a large metropolitan area in the State of Wisconsin.

PROCEDURES: The consulting engineering firm of Donahue and Associates, Sheboygan, Wisconsin, will perform the study, under the general supervision and direction of the Council's Executive Director.

The study area consists of approximately 200 square miles embracing parts of Calumet, Outagamie, and Winnebago Counties. The cities of Neenah, Menasha, Appleton, and Kaukauna are located in the area.

Data pertaining to existing solid wastes collection systems and disposal facilities in the study area will be assembled, updated, and analyzed.

Information concerning topography, geology, soils, land use, and population will also be developed. A tentative area-wide solid waste collection and disposal plan will be prepared and means for its implementation considered. This will include items such as scheduling of construction in accordance with relative need, indication of a financing plan for the proposed facilities, and the coordinative, legislative, and administrative measures required for implementation of the plan.

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At various stages of the project "coordinating conferences" will be held with representatives of Federal, State, and local governments, planning agencies, and private interests concerned with the development of the plan. An initial meeting will be held to explain the project and solicit the cooperation of such groups. The tentative plan, when developed, and means of implementing the plan, will be considered at subsequent meetings. The final such meeting will be devoted to a consideration and discussion of the draft of the completed plan.

Public support for the completed plan and capital improvements program will be developed by means of public hearings, meetings, and conferences and by a public education program designed to secure general acceptance for the planned improvements.

ECONOMIC FEASIBILITY AND ADMINISTRATIVE ORGANIZATION REQUIRED TO CONSTRUCT A 1,000-FOOT SOLID WASTE MOUNTAIN AND RECREATIONAL AREA IN A MAJOR URBANIZED REGION

Project Type: Study & Investigation Grant No. D01-UI-00163

Grantee: The Metropolitan Sanitary District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611

Project Director: Mr. Frank E. Dalton
Acting Chief Engineer
The Metropolitan Sanitary District of Greater Chicago

Estimated Total Project Cost: $210,000

GRANTEE'S SHARE: $ 70,000

FEDERAL SHARE: $140,000 - 01
(by year of project life)

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: To evaluate the feasibility of constructing a large "mountain" in an urbanized area, using solid wastes generated in Cook County, and developing it as a recreational facility for pursuits such as skiing, hiking, picnicking, nature study, tobogganing, skating, and horseback riding.

PROCEDURES: A variety of experts in different aspects of solid waste disposal will be employed on a consulting basis to assist the District's staff in conducting the project.

A suitable site for the proposed mountain will be selected, considering local geological features, prevention of environmental pollution or contamination, and aesthetics. The most suitable methods for handling the solid wastes generated in Cook County will be determined.

An ultimate recreational facility will be designed and anticipated revenues estimated. The numerous interest groups which would be involved in the undertaking will be identified and their cooperation secured. Estimates will be made of construction and operation costs of the proposed facility and rate schedules developed for disposal of solid wastes at the site. A financing plan will be developed, together with a proposed administrative organization to operate the facility. Any legislation required to implement the plan for the facility will be developed and introduced into the Illinois General Assembly.

SOLID WASTE HANDLING AND DISPOSAL IN MULTI-STORY BUILDINGS AND HOSPITALS

Project Type: Study and Investigation Grant No. D01-UI-00164

Grantee: County of Los Angeles
500 West Temple Street
Los Angeles, California 90012

Project Director: John A. Lambie
County Engineer
108 West Second Street
Los Angeles, California 90012

Estimated Total Project Cost:	$260,760
GRANTEE'S SHARE:	$ 89,945
FEDERAL SHARE:	$115,860 - 01
(by year of project life)	$ 54,955 - 02

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1970

OBJECTIVES: To make an in-depth study of the refuse collection and disposal facilities and practices at the various County buildings and institutions, for the purpose of improving and modernizing equipment, methods, and practices, and to provide design standards and code requirements that will ensure adequate sanitary facilities in all buildings to be constructed within the County jurisdiction.

PROCEDURES: Types of County buildings to be studied include office buildings, jails, hospitals, and a hospital complex. A coordinating committee, consisting of County personnel concerned with the operation, maintenance, and administration of waste collection and disposal facilities at these buildings, will be established to assist in guiding the studies, evaluation of results, and preparation of recommendations. The project will be conducted by the consulting firm of Engineering Service Corporation and Greenleaf/Telesca, Los Angeles, California. Various special consultants will be used as required.

Each building or institution will be surveyed to establish present conditions, both physical and sanitary, quantities and types of refuse produced, and present means of disposal. Deficiencies and needs for improvement in the present methods and systems will be noted and analyzed. Surveys of private multi-story and apartment buildings will be made to the extent required to verify the quantities of refuse and similarity of problems as determined by the detailed survey of County facilities.

Investigations will be made of refuse collection, preparation, and handling systems to determine operating characteristics, size and space requirements, and cost of installation and operation. Studies will be made to determine the type of system that might best be employed in each of the types of buildings involved. Consideration will be given to shredding, pulping, and compacting of refuse, and to gravity, pneumatic, vacuum, and containerized handling systems.

Various methods of refuse disposal will be investigated, including salvage, grinding into the sewage collection system, sanitary landfill, composting, and incineration, considering health hazards, air pollution, reliability, and operating cost. The method or methods of refuse disposal that might best be employed in each of the types of buildings under consideration will be determined.

Preliminary designs and cost estimates will be prepared for installation of a system for the collection and disposal of solid wastes in a hospital building complex and a multi-story office building or jail.

SYSTEMS PLANNING FOR REGIONAL SOLID WASTE MANAGEMENT IN AREAS COMPRISING DIVERSE SOCIOECONOMIC CHARACTERISTICS

Project Type: Study & Investigation Grant No. D01-UI-00168

Grantee: City of Albuquerque, New Mexico

Project Director: Larry J. Gordon, Director
Department of Environmental Health
City of Albuquerque
Box 1293
Albuquerque, New Mexico 87103

Estimated Total Project Cost: $98,913

GRANTEE'S SHARE: $32,971

FEDERAL SHARE: $65,942 - 01
(by year of project life)

Date Project Started: April 1, 1968 Date Project Ends: March 31, 1969

OBJECTIVES: To develop a long-range plan for the management of solid wastes for a heterogeneous regional area of Central New Mexico.

PROCEDURES: The project will be conducted by staff of the City's Department of Environmental Health, with consulting engineering services being provided by the firm of D. F. Molzen and Associates, Inc., Albuquerque, New Mexico, and Engineering-Science, Inc., Arcadia, California, and by Dr. John W. Hernandez, Associate Professor, New Mexico State University.

The study area consists of Metropolitan Albuquerque and populated areas north and south of the City. Political jurisdictions in the area are the cities of Albuquerque, Belen, Bernalillo; the village of Los Lunas, the counties of Bernalillo, Valencia, Sandoval; the Isleta and Sandia Pueblos.

Basic data will be developed regarding the current generation of solid wastes in the study area, including agricultural, industrial, municipal and commercial. Special categories may be used for wastes that create special handling or health problems. Projections of future waste generation will be made. Existing solid waste management systems in the study area will be described, and operational costs determined. Ongoing solid waste management programs of the State and related areas will be investigated. Statutes and ordinances that may relate to solid waste management in the study area will be identified. Existing land use and zoning will be determined, and projections made of future land use.

Economic and demographic data will be used to project future employment and population in the study area. Alternate means of financing the proposed program will be developed and an optimal method selected. Physiographic, geologic, meteorologic and groundwater characteristics of the study area will be determined, and a preliminary selection of future landfill sites made on the basis of these studies. Various methods of solid waste disposal will be examined and defined in detail.

An advisory committee, comprised of community leaders from each of the political jurisdictions in the study area, will develop an educational/enforcement program for implementation concurrently with the contemplated solid waste management system. This group would also guide the preparation of a suggested ordinance, which would be considered for adoption and implementation by all of the political entities in the study area.

Solid waste management systems applicable to the study area will be developed and compiled, and the optimal system selected on the basis of overall effectiveness, total cost, and ability to minimize undesirable effects (noise, aesthetic, traffic interference, etc.) on the environment.

The parameters and fundamental principles forming the basis for selection of the optimal solid waste management system, and the method of determining the optimal system of financing, will be generalized for utilization by other areas in planning similar systems to meet analogous problems.

DEVELOPMENT AND TESTING OF COMPACTION AND BALING EQUIPMENT FOR RAIL-HAUL OF SOLID WASTES

Project Type: Study & Investigation Grant No. D01-UI-00170

Grantee: City of Chicago
Department of Streets and Sanitation
City Hall
Chicago, Illinois 60602

Project Director: James V. Fitzpatrick, Commissioner
Department of Streets and Sanitation
City Hall
Chicago, Illinois 60602

Estimated Total Project Cost: $417,501

GRANTEE'S SHARE: $139,167

FEDERAL SHARE: $278,334 - 01
(by year of project life)

Date Project Started: May 1, 1968 Date Project Ends: April 30, 1969

OBJECTIVES: 1. To determine the requirements for the optimum design of production-scale equipment to compress solid wastes into high-density economical pay-loads for transport by rail.

2. To investigate the potential for utilization of compacted solid wastes as a fill material in lakeshore areas.

3. To explore the potential of multi-compaction transfer stations as a means of reducing solid waste collection costs through shorter haul distances.

4. To investigate whether or not the compacted refuse can be placed in a sanitary landfill without causing degradation problems and associated methane gas production.

PROCEDURES: The project will be carried out by the City's Department of Streets and Sanitation, with consultative assistance by the American Public Works Association and Northwestern University.

A baling press, approximating a production press in size, will be obtained, and a suitable test installation constructed. Experimental procedures will be developed and baling experiments designed with a view of obtaining on a production basis the desired bale density of 80 lbs per cu. ft. Press variables to be studied include hydraulic pressures

required, press plate configurations, number of strokes required, and practical bale sizes and configurations. Bale densities obtainable by means of press modifications will be determined. Additives required, if any, to improve bale cohesion will be studied, as well as fluids produced as a result of compaction, "spring back" characteristics of compressed solid wastes, and requirements for bale containment. Test results will be made available to manufacturers of presses and ancillary equipment for evaluation and design work. Criteria for new press designs to produce high density bales will be developed.

Information will be gathered on methods, practices, and experience pertaining to land reclamation from lakeshore areas. Experts in this field will be consulted to determine the practicality of such land reclamation by means of a sanitary landfill using baled solid wastes. The behavior of baled wastes in applicable water conditions will be investigated.

The consulting firm of Barton Aschman Associates will make an analysis of the time and cost of truck haul to various patterns of compaction station locations. Attempts will be made to optimize trip time and distance for general routings. A testing procedure will be developed to compare alternative proposals for location of proposed compaction stations with the detailed routing of collection vehicles.

Landfill cells will be constructed to test the behavior of bales under existing environmental conditions. Leachates will be collected and analyzed, together with gaseous decomposition products. The behavior of the compacted solid wastes will be evaluated in comparison with solid wastes as normally landfilled, and the pollution potential of the baled material will be analyzed.

ENGINEERING EVALUATION OF PLASTIC/PAPER SACKS FOR INCREASED EFFICIENCY OF REFUSE COLLECTION

Project Type: Study & Investigation — Grant No. D01-UI-00172

Grantee: City of Inglewood
City Hall
105 East Queen
Inglewood, California 90301

Project Director: Ralph Stone, President
Ralph Stone & Company, Inc.
10954 Santa Monica Boulevard
Los Angeles, California 90025

Estimated Total Project Cost:	$127,030
GRANTEE'S SHARE:	$ 42,420
FEDERAL SHARE:	$ 44,205 - 01
(by year of project life)	$ 40,405 - 02

Date Project Started: June 1, 1968 — Date Project Ends: May 31, 1970

OBJECTIVES: To make a comprehensive evaluation of available plastic and paper sack materials and appurtenances to determine their overall suitability for use as solid waste containers; to formulate and test alternative means available to encourage public use of bagging systems.

PROCEDURES: The project will be conducted by the consulting engineering firm of Ralph Stone & Company, Inc., Los Angeles, California, in three phases:

Phase I (Nine Months). The availability and costs of plastic and paper bag systems will be determined. Laboratory and pilot studies will be conducted to determine the relative effectiveness of each system for use as solid waste containers. Field studies will be carried out in the Inglewood area to determine background information and consumer attitude toward bags, present collection costs and efficiencies, and to define a pilot area for bagging studies.

Phase II (Six Months). The pilot study area will consist of a representative portion of the City of Inglewood containing about 1,000 collection units. Residents of the area will be informed of the study, and their cooperation requested. Plastic bags, paper sacks, and holders will be distributed to residents in the study area and their use explained. Approximately one-half of the residents will receive plastic

bags, the other half will receive paper sacks. Collection and disposal operations will be conducted for a six-month period to permit comparative evaluations to be made, during both wet and dry seasons of the year, between disposable containers and metal containers, and between plastic bags and paper sacks.

Periodic field surveys will be conducted throughout the study period. Residents will be contacted and the occurrence of damaged bags and sacks, spilled refuse, etc., noted. Detailed collection studies, involving time and motion analysis, motion picture photography, and evaluations will be conducted to determine statistics relative to collection time per stop and containers at the stop. Stops contained in the load, and tonnage collected, will be noted to enable evaluation of the effect of bags on truck capacity.

The possible use of bactericides to reduce odors and nuisance in bag or other containers will be investigated.

The incidence of injuries to collection personnel will be recorded. Effects of bags and sacks on neighborhood appearance and the occurrence of spilled and blowing refuse will be investigated. Environmental surveys will be made to determine the effectiveness of bag-sack systems in reducing the occurrence of fly larva in refuse containers.

Phase III (Nine Months). Results of the pilot study will be analyzed. Alternative methods for distribution of bags and holders will be evaluated. The use and handling of bags in bins and large container systems will be investigated. Further studies involving special wastes, will be conducted.

DEVELOPMENT OF A SOLID WASTE DISPOSAL PLAN AND PROGRAM INTEGRATED WITH THE COMPREHENSIVE REGIONAL PLANNING PROCESS

Project Type: Demonstration

Grant No. D01-UI-00174

Grantee: Regional Planning Council
701 St. Paul Street
Baltimore, Maryland 21202

Project Director: Robert N. Young
Executive Director
Regional Planning Council

Estimated Total Project Cost:	$178,279
GRANTEE'S SHARE:	$ 59.426
FEDERAL SHARE:	$ 34,003 - 01
(by year of project life)	42,683 - 02
	42,167 - 03

Date Project Started: June 1, 1968

Date Project Ends: May 31, 1971

OBJECTIVES: To develop a solid waste disposal plan and program and management advisory procedures for the Baltimore Metropolitan Area integrated with the continuing comprehensive regional planning process and with State and local solid waste disposal planning activities.

PROCEDURES: The project will be conducted by staff of the Regional Planning Council, with the participation of governmental units in the Baltimore Metropolitan Area. The demonstration will be carried out in three phases, each of which is expected to take about a year.

Phase I. This will be primarily devoted to considerations associated with solid waste disposal. Several alternative plans for sets of disposal sites, using various disposal methods, will be developed, along with estimates of the cost of each. Major work elements will include identification of existing collection and disposal systems, and the obtaining of information regarding new and improved technologies for waste disposal and treatment of wastes prior to disposal.

Special studies will include the development of cost estimates for a system of compressing, baling, and packaging refuse for shipment to a site remote from the urban area. Other special studies will be undertaken to aid local governments in evaluating disposal technologies and selecting sites for needed disposal facilities. The possibility of a computer-oriented systems analysis study of solid waste collection and transport will be explored with personnel of Johns Hopkins University.

Phase II. Seasonal variations in the quantity and characteristics of solid wastes produced in the study area will be investigated. Federal, State, and local laws governing solid wastes will be compiled. Sources of junked automobiles, appliances, etc., will be determined. Costs of solid waste collection, transport, and disposal will be determined. During this phase the major effort will be towards a program of optimization by computer, of the collection and disposal system for the region, using the various disposal plans developed in phase I.

Phase III. The computer simulation evaluation will continue into this phase. Other major work items will include administrative and legal studies, development of recommendations for implementation of the regional plan, and for implementation of a public education and information program.

STUDY AND INVESTIGATION OF USE OF PREPARED REFUSE WITH COAL IN LARGE UTILITY BOILERS

Project Type: Study & Investigation Grant No. D01-UI-00176

Grantee: City of St. Louis
City Hall
St. Louis, Missouri 63103

Project Director: G. Wayne Sutterfield
Commissioner of Refuse Collection and Disposal
4100 South First Street
St. Louis, Missouri 63118

Estimated Total Project Cost: $60,000

GRANTEE'S SHARE: $20,000

FEDERAL SHARE: $40,000 - 01
(by year of project life)

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: To determine the feasibility of blending controlled small percentages of properly prepared municipal refuse with coal for use as fuel in large coal-fired boiler plants.

PROCEDURES: The consulting engineering firm of Horner & Shifrin, Inc., St. Louis, Missouri, will conduct the study. Union Electric Company, St. Louis, will assist, in an advisory capacity, in determining the economic and engineering feasibility of the proposed process.

The following items will be considered in detail in order to determine the physical feasibility of the proposed process: (1) necessary degree of preparation of the refuse for blending with coal, and facilities required; (2) percentage of refuse that can be used as fuel, and heat value thereof; (3) types of boilers applicable to the proposed process; (4) optimum percentage of prepared refuse in fuel mixture; (5) combustion air requirements: (6) disposal of portion of refuse not suitable for use as fuel; (7) evaluation of problems in storage and transport of prepared refuse, and problems attendant to fuel blending.

The relative economic aspects of the proposed process will require evaluation of the effects upon the operations of the involved municipal corporation, as well as upon those of the utility company. Capital costs of refuse preparation, storage, and transport facilities will be estimated, as well as capital costs of necessary facilities at

existing or new boiler plants. Corresponding operation and maintenance costs will be estimated. The foregoing costs will be converted into applicable units for comparison with the costs of other methods of refuse disposal.

Potential long-range problems will be considered on a preliminary basis. Among the matters deserving particular consideration are the possibilities of slagging, corrosion, erosion, boiler tube deposits, unusual difficulties with milling and firing apparatus, and effects on air pollution control equipment.

Public health aspects of handling and storage of the solid wastes will be considered. These will include precautions necessary in design and operation to minimize nuisances and health hazards due to dust, odors, blowing paper, insect propagation, rodents, and effects on air pollution.

Potential benefits of the proposed process to the community will be evaluated and community-utility relationships and responsibilities in any full-scale application of the process will be considered.

COMPREHENSIVE SOLID WASTE MANAGEMENT IN A RURAL COUNTY
(CLEAN AND GREEN - CHILTON COUNTY, ALABAMA)

Project Type: Demonstration Grant No. D01-UI-00178

Grantee: Board of Revenue and Control of Chilton County, Alabama
Court House
Clanton, Alabama 35045

Project Director: R. M. Alexander
County Engineer's Office
Airport Road
Clanton, Alabama 35045

Estimated Total Project Cost:	$296,375
GRANTEE'S SHARE:	$106,775
FEDERAL SHARE: (by year of project life)	$124,680 - 01 32,260 - 02 32,660 - 03

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1971

OBJECTIVES: To demonstrate the feasibility of county-wide collection of municipal and rural solid wastes for disposal at a single centrally-located sanitary landfill.

PROCEDURES: Chilton County will establish a sanitary landfill site for the disposal of all solid wastes generated in the county. All existing open dumps, some 40 to 50 in number, will be closed.

Collection services will be provided by the county for the rural population, by means of a containerized storage and collection system. A study of population distribution and solid waste production in the county will be conducted to select locations for the roadside placement of covered waste receptacles and to select optimal routes to those locations. Twice-a-week collection from the containers will be scheduled. A public education program will be carried out to acquaint the rural population with the system and explain its use.

The four municipalities in the county will continue their present collection services, but the collected wastes will be brought to the county landfill for disposal. A consultant will be employed to study the municipal collection procedures to ascertain if improvements can be made.

Records will be kept to evaluate the efficiency and technical success of the program. An environmental sanitation re-survey will be made near the end of the second year of the project, and results compared with a similar survey made before the project was initiated. Improvements in sanitary conditions will be evaluated. Concurrently, the consultant will re-survey municipal collection methods to evaluate effects of improved methods implemented as a result of his initial survey. During the final year of the project a topographic map of the site as altered by the landfill operation will be prepared. Possible uses for the reclaimed area will be determined, and value of the altered site will be estimated.

STUDY AND INVESTIGATION OF SOLID WASTES IN THE CHARLESTON, WEST VIRGINIA STANDARD METROPOLITAN STATISTICAL AREA AND KANAWHA COUNTY, WEST VIRGINIA

Project Type: Study & Investigation Grant No. D01-UI-00186

Grantee: Regional Development Authority of Charleston-Kanawha County, West Virginia Metropolitan Region
301 Kanawha Banking & Trust Building
Charleston, West Virginia 25301

Project Director: James Hodges
Regional Development Authority of Charleston-Kanawha County, West Virginia Metrolopitan Region

Estimated Total Project Cost:	$60,176
GRANTEE'S SHARE:	$20,176
FEDERAL SHARE: (by year of project life)	$40,000 - 01

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: To develop a solid waste management program for the Charleston-Kanawha County Metropolitan Region.

PROCEDURES: The consulting engineering firm of Kelly, Gidley, Staub, & Blair, Inc., Charleston, West Virginia, will perform the technical phases of the work.

Available data concerning solid waste generation in the study area will be reviewed. Information will be obtained relative to projections of population, industrial and commercial development, land use and transportation plans, and an analysis made of present and anticipated future service demands. Existing solid waste collection and disposal facilities will be analyzed, and costs of collection, transportation, and disposal developed. Alternate methods of disposal will be compared and possible disposal sites identified. Preliminary designs and cost estimates for a regional system will be prepared, with recommendations for legislation required and financing of the proposed system.

PROCESSING OF BULKY, METALLIC SOLID WASTES

Project Type: Study & Investigation Grant No. D01-UI-00187

Grantee: Maryland State Department of Health
301 W. Preston Street
Baltimore, Maryland 21201

Project Director: Wilfred H. Shields, Jr.
Acting Chief
Division of Solid Wastes
Maryland State Department of Health

Estimated Total Project Cost: $42,915

GRANTEE'S SHARE: $14,305

FEDERAL SHARE: $28,610 - 01
(by year of project life)

Date Project Started: June 1, 1968 Date Project Ends: May 31, 1969

OBJECTIVES: To investigate the possibility of eliminating automobile graveyards and junkyards by determining the economic feasibility of operating a central facility to: receive discarded vehicles and other junk material such as appliances and machinery; immediately break them into their components; and move them either to scrap processing yards, to storage for later use in the economic cycle, to warehouses of spare parts, or to solid waste disposal facilities.

PROCEDURES: The detailed study will be conducted by the consulting firm of Management Technology, Inc., Washington, D.C.

An analysis of the extent of the junk problem will be made through research of Federal, State and local government data, reviews with salvage yard operators, processors, and scrap metal dealers, and by an evaluation of selected urban areas. Current practices and trends in collecting, storing, processing, salvaging, and disposing of these bulky items will be determined.

Methods for locating junk-receiving yards will be investigated, taking into consideration quantity and distribution of this type of solid waste, land use plans, needed facilities, and legislative requirements.

A systems model will be developed for the procedures and costs of processing the junk items from generation source, through receiving yard, to ultimate destination. This will include the development

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of methods for transporting the junk items to the receiving yard, development of a management systems model for the operation of a pilot demonstration program, and determination of the destination of the materials as they leave the processing facility. A plan of action for implementation of a pilot demonstration project will be developed.

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